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1. Claim 24 was rejected under 35 U.S.C. §102(b) over Covell '367.

The presently claimed method of manufacturing a circuit board comprises simultaneously and unitarily forming wiring patterns and protrusions, where the wiring patterns extend across a surface of an insulating substrate and connect at least two locations on the substrate. This method is nowhere disclosed or suggested in the cited reference.

Covell '367 is alleged to disclose simultaneously and uniformly forming protrusions 72 along with wiring patterns 71. No portion of the patent is cited in support of this proposition. In fact, Covell '367, column 6, lines 8-40, describes Fig. 3 as showing filling the mold to form pillar 70 having a column-like body 72 with broadened head 71.

The Office Action contains no mention the second feature of claim 24, namely, the wiring patterns extending across a surface of an insulating substrate and connecting at least two locations on the substrate. The difference between Covell '367 and the presently claimed method is that the latter simultaneously and unitarily forms the protrusions and wiring patterns that connect

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at least two locations on an insulating substrate. Both conditions must be present, i.e., (1) the method of formation and (2) the requirement that the formed wiring patterns connect to at least two locations on the same insulating substrate. Covell '367 simply does not disclose the second of these two claimed elements, as discussed in more detail below.

Covell '367, column 6, line 35, describes protrusion 72 in terms of cast solder pillar 70 having a column-like body 72 with broadened head 71. The Examiner states that broadened head 71 is a wiring pattern. However, head 71 does not connect at least two locations together on an insulating substrate, as required by claim 24. Covell '367, Figs. 2-6, do not show broadened head 71 connecting to more than one location, and Covell '367 does not teach or suggest that head 71 connecting to at least two locations on the insulating substrate would be beneficial or desirable.

Instead, each pillar 70/protrusion 72/broadened head 71 connects a single location on a carrier 95 with a pad on a separate device, such as a semiconductor device or some other substrate, which is a simple point-to-point connection between

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one point on one device surface with one point on another device surface. But, claim 24 recites a wiring pattern connecting between more than one location on the insulating substrate, not on surfaces of two separate devices. See Covell '367, Figs. 5-6, showing cast pillar 70/protrusion 72/broadened head 71 attached to a semiconductor device carrier 95, which is then available for attachment by pillar 70/protrusion 72/broadened head 71 to a separate substrate (Covell '367 27-36). Nowhere in Covell '367 is there any disclosure that pillars 70/protrusions 72/broadened heads 71 are each connected to more than one location on any single substrate. Accordingly, Covell '367 does not describe pillar 70/protrusion 72/broadened head 71 as extending across a surface of an insulating substrate and connecting at least two locations on the insulator substrate, as presently claimed.

For the foregoing reasons, Covell '367 fails to disclose all elements of applicants' claimed invention, and therefore is not a proper basis for rejection under §102. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested. If the rejection is maintained, the

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Examiner is asked to note on the record those portions of Covell '367 that are supposed to show the features of claim 24.

2. Claim 25 was rejected under 35 U.S.C. §103(a) over Covell '367 and Abe U.S. Patent 5,746,868.

Claim 25 recites wiring patterns and protrusions made of a same conductive sintered material. Claim 25, which depends from claim 24, is patentable for the reasons described above for claim 24.

Moreover, the Examiner admits that Covell '367 does not disclose a same conductive sintered material for the wiring patterns and protrusions, and cites Abe '868 as allegedly teaching same. However, Abe '868 does not overcome the deficiencies of Covell '367 to make a proper rejection, i.e., Abe '868 does not disclose or suggest simultaneously and uniformly forming protrusions and wiring patterns, where the wiring patterns extend across a surface of an insulating substrate and connect at least two locations on the substrate, as claimed.

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For the foregoing reasons, neither Covell '367 nor Abe '868 contains any teaching, suggestion, reason, motivation or incentive that would have led one of ordinary skill in the art to applicants' claimed invention. Nor is there any disclosure or teaching in either of these references that would have suggested the desirability of combining any portions thereof effectively to suggest applicants' presently claimed invention. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

3. Claims 35-36 were rejected under 35 U.S.C. §103(a) over Covell '367, Abe '868 and Tsunoi et al. U.S. Patent 6,482,676, and claims 29-30 were rejected under 35 U.S.C. §103(a) over Covell '367, Abe '868 and Tsunoi '686.

The Examiner admits that Covell '367 does not disclose protrusions having substantially equal heights or imposing a load on such protrusions, and cites Abe '868 as allegedly teaching same. However, Abe '868 does not provide disclosure to overcome the deficiencies of Covell '367 described supra, i.e., Abe '868 does not disclose or suggest simultaneously and

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uniformly forming protrusions along with wiring patterns, where the wiring patterns extend across a surface of an insulating substrate and connect at least two locations on the substrate, as claimed.

Also, the Examiner cites Tsunoi '686 as allegedly teaching modifying protrusions by imposing a load. However, Tsunoi '686 likewise does not overcome the deficiencies of Covell '367 described herein.

For the foregoing reasons, none of Covell '367, Abe '868 and Tsunoi '686 contains any teaching, suggestion, reason, motivation or incentive that would have led one of ordinary skill in the art to applicants' claimed invention. Nor is there any disclosure or teaching in any of these references that would have suggested the desirability of combining any portions thereof effectively to suggest applicants' presently claimed invention. Claim 29, which depends from claim 30, is allowable for the same reasons described herein for claim 30, and claims 35 and 36, which depend from claim 24, are allowable for the same reasons described herein for claim 24. Accordingly,

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reconsideration and withdrawal of this rejection are respectfully requested.

All claims 24, 25, 29, 30, 35 and 36 are now proper in form and patentably distinguished over all grounds of rejection cited in the Office Action. Accordingly, allowance of all claims 24, 25, 29, 30, 35 and 36 is respectfully requested.

Should the Examiner deem that any further action by the applicants would be desirable to place this application in even better condition for issue, the Examiner is requested to telephone applicants' undersigned representatives.

Respectfully submitted,

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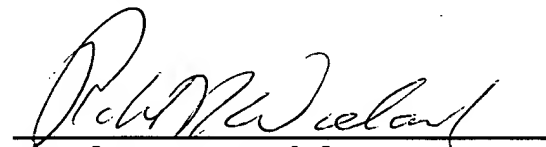
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